Trend Study 17-67-05

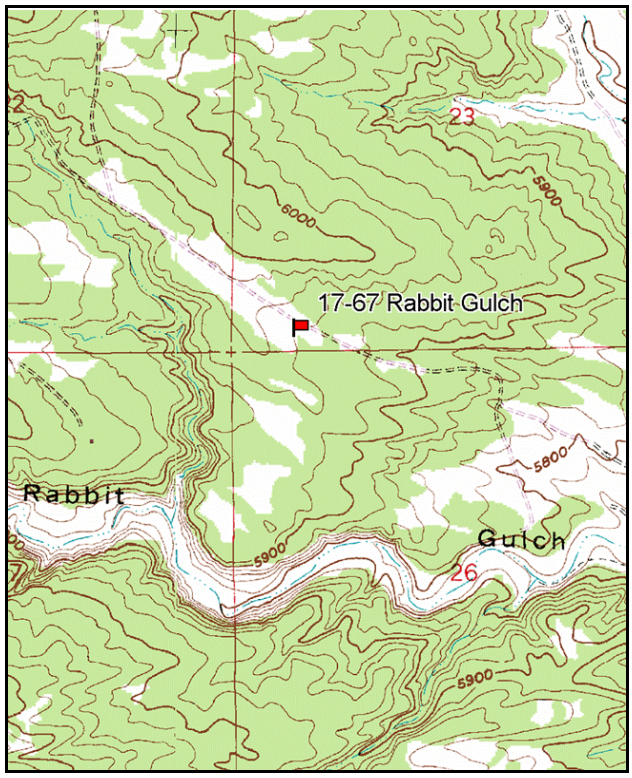
Study site name: Rabbit Gulch . Vegetation type: Wyoming Big Sagebrush .

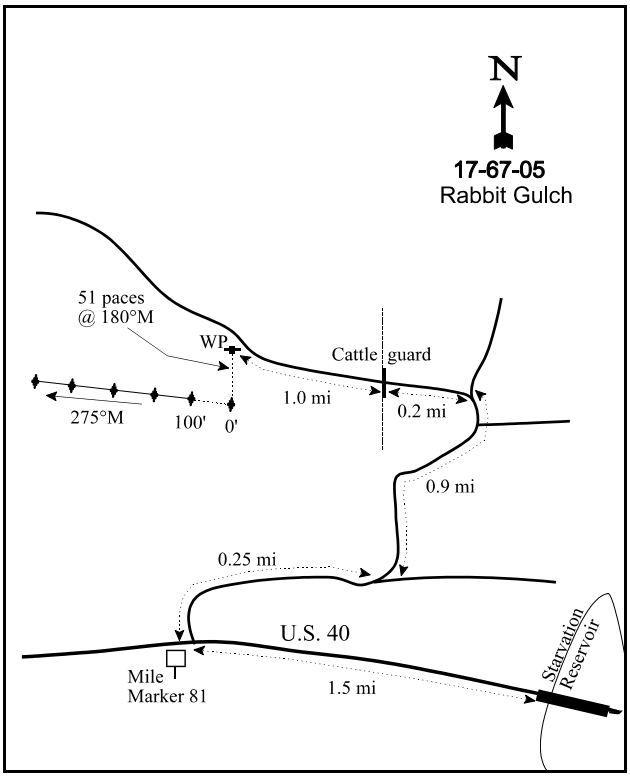
Compass bearing: frequency baseline 275 degrees magnetic.

Frequency belt placement: line 1(11ft), line 2(34 ft), line 3(59 ft), line 4(71 ft), line 5 (95 ft).

LOCATION DESCRIPTION

From the Starvation Bridge on U.S. 40 travel west 1.5 miles to a turnoff on the north side of the road. Follow this road 0.25 miles to a fork. Continue left 0.9 miles and staying left. Continue 0.2 miles to a cattleguard and fence. After the cattleguard proceed 1.0 mile to a witness post on the left side of the road. From the witness post walk 51 paces at 180 degrees magnetic to the 0-foot stake. The 0-foot stake is marked by browse tag #94.





Map name: Rabbit Gulch

Diagrammatic Sketch

Township 3S , Range 6W , Section 23

GPS: NAD 27, UTM 12T 4449679 N, 539431 E

DISCUSSION

Rabbit Gulch - Trend Study No. 17-67

The Rabbit Gulch study was established in 1997 to monitor critical deer winter range on the south side of the Uintah Mountains. The study is on a gentle (3%), east-facing slope at an elevation of 5,900 feet. Starvation Reservoir lies about 2 miles to the east. The land is owned and managed by the Division of Wildlife Resources in the Rabbit Gulch Management Area. Deer use was been heavy in both 1997 and 2001, then decreased slightly in 2005. Elk use was light in 1997 and has continued at that level. Quadrat frequency for deer pellet groups was 72% in 1997, 85% in 2001, and 53% in 2005. Pellet group data from 2001 was estimated at 171 deer, 26 elk, and 2 cow days use/acre (423 ddu/ha. 65 edu/ha, and 5 cdu/ha). Pellet group data from 2005 was estimated at 94 deer, 17 elk, and 12 cow days use/acre (231 ddu/ha, 43 edu/ha, and 30 cdu/ha).

Soils have a sandy loam texture with a moderately alkaline pH of 8.0. Estimated effective rooting depth was over 16 inches with little to no rock being sampled on the surface or within the profile. Phosphorus is low at 5.1 ppm. Values below 6 ppm may limit normal plant growth and development (Tiedemann and Lopez 2004). Nearly half of the soil surface is covered by bare ground, while vegetation and litter cover have only moderate values. Cryptogams were much less abundant in 2001 and 2005, which lowered the amount of the protective ground cover. An erosion condition class assessment done in 2001 and 2005 categorized soil to be stable to slightly eroding. Excessive pedestaling around shrub stems provided the most evidence of erosion.

The key browse consists of Wyoming big sagebrush hybridized with black sagebrush. Both species were classified together as Wyoming big sagebrush because of difficulty in differentiating between the two species. Sagebrush density estimates were 3,060 plants/acre in 1997, 3,080 in 2001, and dropped to 1,840 in 2005. Average cover estimates were 4% in 1997 and 2001, then dropped to 2% in 2005. Due to the abundance of pellet groups during all samples, it was not surprising that sagebrush showed moderate to heavy use. Percent decadence has steadily increased since 1997, reaching a high point in 2005 of 46%. In 2005, 30% of the population was classified as dying. Young recruitment was very low in 2005, but several seedlings were observed that may help replace dying plants if they survive and become established. Average leader growth for Wyoming big sagebrush was less than 2 inches in 2001 and almost 3 inches in 2005.

Other less abundant browse includes fourwing saltbush, shadscale, winterfat, and stickyleaf low rabbitbrush. Pinyon and juniper trees have begun to invade the old chaining. In 2001, the estimated density of pinyon trees was 29 trees/acre and 68 juniper trees/acre. Most trees are small as stem diameter averaged less than 3 inches for both pinyon and juniper. The encroaching pinyon-juniper trees were hand cut in the fall of 2004.

The herbaceous component is comprised primarily of perennial grasses. Crested wheatgrass was seeded sometime in the past and in 2001 it was the most abundant species. The average cover of crested wheatgrass was 15% and needle-and-thread was 3.5% in 2001. In 2005, crested wheatgrass averaged only 3% cover and needle-and-thread increased to 17% average cover. Six weeks fescue was fairly abundant around the base of sagebrush plants. Grasses appeared moderately hedged. Forbs are rare and insignificant, especially perennial species.

2001 TREND ASSESSMENT

Trend for soil is stable. Vegetation and litter cover increased. Bare ground remains relatively high, but similar to 1997 estimates. Trend for browse is slightly down. Sagebrush was split into both Wyoming big sagebrush and black sagebrush, although most of the sagebrush is likely a hybrid between the two species. Wyoming big sagebrush still shows moderate to heavy use, elevated poor vigor, and increased percent decadency. Black sagebrush also displays moderate to heavy use, but percent decadency and poor vigor are lower than that of Wyoming big sagebrush. Trend for the herbaceous understory is stable. Sum of nested frequency for

perennial grasses slightly increased. Crested wheatgrass, blue grama, and needle-and-thread remain the dominant species. Forbs are still rarely encountered. The Desirable Components Index rated this site as good to fair with a score of 46 due to low shrub cover, moderate shrub decadence, and excellent perennial grass cover.

TREND ASSESSMENT
soil - stable (0)
browse - slightly down (-1)
herbaceous understory - stable (0)
1997 winter range condition (DC Index) - good (53) Lower Potential scale
2001 winter range condition (DC Index) - good to fair (46) Lower Potential scale

2005 TREND ASSESSMENT

Trend for soil is stable. Bare ground remained similar to previous years and the ratio of protective cover (vegetation, litter, cryptograms) to bare ground has changed little. Trend for key browse Wyoming big sagebrush is down. Density decreased from 3,080 plants/acre in 2001 to 1,840 in 2005. Percent decadency is high at 46% with 30% of the sagebrush population being classified as dying. Young recruitment is low and not enough to replace the number of dying plants in the population. Utilization is moderate to heavy and vigor is poor. Trend for the herbaceous understory is stable. The sum of nested frequency and the percent cover of perennial grasses has not changed although the composition has changed. Crested wheatgrass was the dominate grass with 15% average cover in 2001 and needle-and-thread with 3.5% cover. These two grasses swapped places and in 2005 needle-and-thread had 17% average cover and crested wheatgrass had just over 3%. The Desirable Components Index rated this site as fair with a score of 37 due to low shrub cover, high shrub decadence, with an excellent perennial grass cover.

TREND ASSESSMENT
soil - stable (0)
browse - down (-2)
herbaceous understory - stable (0)
winter range condition (DC Index) - fair (37) Lower level Potential scale

HERBACEOUS TRENDS --
Management unit 17 , Study no: 67

Type	Species	Nested Frequency			Average Cover %		
		'97	'01	'05	'97	'01	'05
G	Agropyron cristatum	$_{b}$347	$_{b}$312	$_{a}$153	8.44	15.27	3.39
G	Agropyron dasystachyum	$_{b}$22	$_{a}$1	$_{a}$-	.16	.00	-
G	Bouteloua gracilis	$_{a}$71	$_{b}$141	$_{a}$58	.85	6.03	1.25
G	Bromus tectorum (a)	-	-	-	.00	-	-
G	Elymus junceus	$_{a}$3	$_{b}$22	$_{ab}$10	.03	.43	.21
G	Hilaria jamesii	-	-	8	-	-	.18
G	Oryzopsis hymenoides	13	15	15	.17	.25	.26
G	Stipa comata	$_{a}$76	$_{a}$75	$_{b}$295	1.03	3.54	17.02
G	Vulpia octoflora (a)	$_{b}$127	$_{a}$44	$_{c}$192	.61	.15	2.36

Type	Species	Nested Frequency			Average Cover %		
		'97	'01	'05	'97	'01	'05
Total for Annual Grasses		127	44	192	0.62	0.15	2.36
Total for Perennial Grasses		532	566	539	10.71	25.53	22.32
Total for Grasses		659	610	731	11.33	25.68	24.69
F	Alyssum alyssoides (a)	4	-	2	.00	-	.01
F	Chenopodium fremontii (a)	$_{a}$2	$_{a}$2	$_{b}$21	.01	.01	.25
F	Chenopodium leptophyllum(a)	$_{a}$-	$_{a}$-	$_{b}$27	-	-	.22
F	Collomia linearis (a)	3	-	-	.00	-	-
F	Collinsia parviflora (a)	$_{a}$-	$_{ab}$6	$_{b}$12	-	.01	.05
F	Cryptantha sp.	3	-	-	.00	-	-
F	Descurainia pinnata (a)	$_{a}$-	$_{a}$6	$_{b}$43	-	.42	.35
F	Draba sp. (a)	-	-	1	-	-	.00
F	Eriogonum cernuum (a)	5	6	-	.01	.04	-
F	Gilia sp. (a)	-	-	2	-	-	.00
F	Hymenoxys richardsonii	-	4	9	-	.06	.23
F	Lappula occidentalis (a)	$_{a}$-	$_{b}$33	$_{b}$91	$_{c}$-	.51	.91
F	Machaeranthera grindelioides	1	-	1	.00	-	.00
F	Phlox longifolia	-	6	-	-	.01	-
F	Plantago patagonica (a)	-	-	3	-	-	.03
F	Sphaeralcea coccinea	$_{a}$4	$_{a}$6	$_{b}$23	.01	.01	.38
F	Townsendia incana	$_{ab}$6	$_{a}$-	$_{b}$14	.01	-	.28
Total for Annual Forbs		14	53	202	0.03	1.00	1.84
Total for Perennial Forbs		14	16	47	0.03	0.07	0.90
Total for Forbs		28	69	249	0.07	1.07	2.75

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 17 , Study no: 67

Type	Species	Strip Frequency			Average Cover %		
		'97	'01	'05	'97	'01	'05
B	Artemisia tridentata wyomingensis	70	62	50	4.35	4.43	2.42
B	Atriplex canescens	0	0	1	-	-	-
B	Atriplex confertifolia	0	1	1	-	.03	.15
B	Ceratoides lanata	1	2	0	-	-	-
B	Chrysothamnus nauseosus consimilis	0	2	0	-	.60	-
B	Chrysothamnus viscidiflorus viscidiflorus	15	12	4	.61	.84	.53
B	Eriogonum microthecum	0	1	0	-	-	-
B	Gutierrezia sarothrae	25	24	30	.16	.98	.64
B	Juniperus osteosperma	1	1	0	1.03	.76	-
B	Opuntia sp.	24	22	28	.27	.36	.78
B	Sclerocactus sp.	1	2	1	.03	.06	.03
Total for Browse		137	129	115	6.47	8.07	4.56

CANOPY COVER, LINE INTERCEPT --
Management unit 17 , Study no: 67

Species	Percent Cover	
	'01	'05
Artemisia tridentata wyomingensis	-	2.31
Atriplex confertifolia	-	.28
Chrysothamnus viscidiflorus viscidiflorus	-	.20
Gutierrezia sarothrae	-	.90
Juniperus osteosperma	.20	-
Opuntia sp.	-	.25
Sclerocactus sp.	-	.08

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 17 , Study no: 67

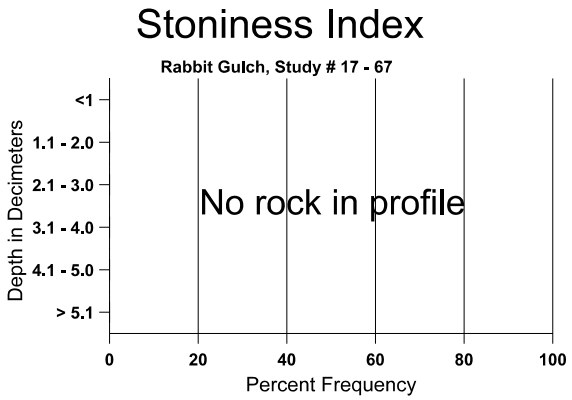
Species	Average leader growth (in) '05
Artemisia tridentata wyomingensis	2.8

BASIC COVER --
Management unit 17 , Study no: 67

Cover Type	Average Cover % '97	'01	'05
Vegetation	14.82	33.59	29.00
Rock	.01	0	0
Pavement	.08	0	.15
Litter	23.74	27.52	24.78
Cryptogams	5.82	.94	.72
Bare Ground	47.28	48.83	54.71

SOIL ANALYSIS DATA --
Herd Unit 17, Study no: 67, Rabbit Gulch

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	ppm P	ppm K	dS/m
16.3	74.8 (14.0)	8.0	78.6	10.8	10.6	0.6	5.1	96.0	0.4



PELLET GROUP DATA --
Management unit 17 , Study no: 67

Type	Quadrat Frequency		
	'97	'01	'05
Rabbit	16	31	42
Elk	3	22	10
Deer	72	85	53
Cattle	3	1	5

Days use per acre (ha)	
'01	'05
-	-
26 (65)	17 (43)
171 (423)	94 (231)
2 (5)	12 (31)

BROWSE CHARACTERISTICS --
Management unit 17 , Study no: 67

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Artemisia tridentata wyomingensis												
97	**3060**	60	860	1860	340	260	63	22	11	6	42	19/31
01	**3080**	-	220	2040	820	200	37	42	27	20	20	11/19
05	**1840**	280	20	980	840	660	29	63	46	30	36	17/24
Atriplex canescens												
97	**0**	-	-	-	-	-	0	0	-	-	0	-/-
01	**0**	-	-	-	-	-	0	0	-	-	0	43/62
05	**60**	-	60	-	-	-	0	0	-	-	0	26/37
Atriplex confertifolia												
97	**0**	-	-	-	-	-	0	0	0	-	0	-/-
01	**20**	-	-	-	20	20	0	0	100	-	0	13/31
05	**60**	-	-	60	-	-	0	0	0	-	0	21/39
Ceratoides lanata												
97	**20**	-	-	20	-	-	100	0	-	-	0	7/7
01	**40**	-	40	-	-	-	0	0	-	-	0	14/10
05	**0**	-	-	-	-	-	0	0	-	-	0	23/26
Chrysothamnus nauseosus consimilis												
97	**0**	-	-	-	-	-	0	0	0	-	0	-/-
01	**40**	-	-	20	20	20	0	0	50	50	50	11/10
05	**0**	-	-	-	-	-	0	0	0	-	0	-/-
Chrysothamnus viscidiflorus viscidiflorus												
97	**560**	-	220	340	-	-	11	0	0	-	4	15/24
01	**400**	-	60	300	40	20	0	0	10	5	40	11/20
05	**100**	-	-	100	-	-	0	0	0	-	0	15/21

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Eriogonum microthecum												
97	**0**	-	-	-	-	-	0	0	-	-	0	-/-
01	**40**	-	-	40	-	-	0	0	-	-	0	-/-
05	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Gutierrezia sarothrae												
97	**980**	80	120	860	-	-	0	0	0	-	0	7/8
01	**1280**	-	-	1200	80	280	0	0	6	-	6	6/8
05	**1060**	-	-	1060	-	-	0	0	0	-	0	9/11
Juniperus osteosperma												
97	**20**	-	20	-	-	-	0	0	-	-	0	-/-
01	**20**	-	-	20	-	-	0	0	-	-	0	-/-
05	**0**	-	-	-	-	20	0	0	-	-	0	-/-
Opuntia sp.												
97	**560**	-	60	480	20	40	0	0	4	4	4	5/12
01	**620**	40	80	500	40	-	0	0	6	-	0	3/12
05	**620**	-	40	540	40	20	0	0	6	-	0	6/19
Sclerocactus sp.												
97	**20**	-	-	20	-	-	0	0	-	-	0	-/-
01	**40**	-	20	20	-	-	0	0	-	-	0	-/-
05	**20**	-	-	20	-	-	0	0	-	-	0	5/4